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ABSTRACT

The effects of student socioeconomic status (SES) and four teacher behaviors--teacher structure, teacher affect, cognitive level of questions, and group size--on student reading achievement were analyzed. Subjects were 36 fifth and sixth grade classroom teachers and their 820 students. Data were collected with the Reading Comprehension Subtest from the Iowa Tests of Basic Skills, an estimate of SES, and the Georgia Assessment of Teacher Effectiveness (GATE). The results upheld many previous findings, indicating that high SES students scored higher in reading than did low SES students. Although the analyses produced no significant interaction F-ratios, high and low frequency of selected teacher behaviors seemed to make a difference in student reading behavior. Apparently, structured academic time did not produce better reading achievement for either high or low SES students, but structured student behavior had a negative impact, especially on low SES students. Students under the influence of hostile teacher behavior also were negatively affected. Low SES students achieved better with low cognitive level questions. Students who had the opportunity to participate in small group activities, either prescribed or independent, achieved at a higher rate. (RL)

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Effect of Teacher Structure, Teacher Affect, Cognitive Level of Questions, Group Size and Student Social Status on Reading Achievement

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Introduction

Repeated findings of studies seeking significant predictors of reading achievement indicate socioeconomic status, or family income in particular, to be an important determiner. However, Summers and Wolfe (1977) reported contrary findings after examining educational inputs of pupil-specific data related to sixth grade achievement. The results indicated this significant predictor was cancelled by the interaction effects with other variables. A more recent study (Kean, 1977) of fourth grade students also indicated socioeconomic status was not a significant predictor of reading achievement.

Other investigations (Medley, 1977, Soar, 1973; Lorentz, Creamer, and Coker, 1978) found that certain teacher behaviors as well as student social status are predictors of reading achievement. These findings indicate a need for further study of the main effect and interaction effect of optimal teaching strategies with socioeconomic status, particularly above third grade level (Medley, 1978).

This paper analyses the main effects and interaction effects of four teacher behaviors - teacher structure, teacher affect, cognitive level of questions, group size - and student social status as they relate to the reading achievement.

Method

Subjects

The subjects of the present study were 53 5th and 6th grade classroom teachers and their students in a large metropolitan school district. During the observation periods 36 teachers taught Language Arts to 820 students; these comprised the sample for the present study.

Measures

The Reading Comprehension Subtest from Iowa Tests of Basic Skills, Form 5 and 6, Levels Edition, (ITBS) (Lindquist, 1971) was given to all pupils involved in the study. The reported reliability and validity for the ITBS are adequate for use in the present study.

SES. An estimate of the socioeconomic status (SES) was obtained for each pupil based upon the occupation of the family's principal breadwinner. This occupational information was transformed to a 1-8 scale (1=high status, 8=low status) using a modified version of Warner, Meeker, and Eells (1960) classification of occupations and levels. Pupils with missing SES were assigned the mean for their classroom, rounded to the nearest whole number.

GATE. The Carroll County, Georgia Competency-Based Teacher Certification (CBTC) Project has been examining teacher behaviors in actual classrooms for the past five years. After utilizing five well-established observation systems designed to measure teacher behaviors, student behaviors and teacher-student interactions (CASES, STARS, OSCAR, FLACCS, and TPOR), the project developed a new measure called the Georgia Assessment of Teacher Effectiveness (GATE). GATE contains 341 sign items which were the most stable and reliable, and which appeared to represent the most important elements of the original instruments.

The GATE can be administered only by specially trained observers. The role of the observer is to record those behaviors which occur while making no evaluative judgments about the appropriateness of the methods used, the quality of the instruction, the clarity of explanations, etc.

The items on GATE can be scored on a variety of keys to yield multiple stable measures of teachers' classroom behavior. The scoring of the GATE is independent of the data collection by observers. Coker (1978) provides a complete description of GATE.

Data Collection

The initial Reading tests were administered early in the Fall (1977) to 820 students in the 36 Reading classrooms and posttests administered in late Spring (1978) in the same 36 classrooms. A group of specially-trained testers administered the tests in each classroom. An estimate of each student's social status (SES) was obtained based on parental occupation.

During regular class sessions, trained observers visited each classroom on six different occasions and obtained two GATE records on each visit.

Visits were scheduled in advance, but no attempt was made to preselect the activities to be observed, since the intent was to record a representative sample of the behavior present in each classroom.

All observations were made by experienced classroom teachers who had been employed full-time as observers and been personally trained by the authors of GATE. Observer agreement studies, confirmed that the observers were consistently able to maintain agreement of 80 percent or better.

Analysis

Scoring

Tests were hand or machine scored, keypunched and verified. Observation data were keypunched from the data collection forms and verified. All data processing was performed at West Georgia College's Computer Center.

ITBS reading scores were converted from raw scores to Standard Scores using the published Standard Score Tables (Houghton Mifflin, 1973). These scores used a normalized standard score scale with a mean of 80 and a standard deviation of 20 for the entire grade range, 3-8 data in a single analysis.

Indicator Scores

A set of GATE scores for each class was generated in the following way: The investigators selected items from GATE which appeared to reflect each of the dimensions being studied. The 12 records for each teacher were then scored on the five dimensions. Each item, in z-score form, was given positive or negative weight and the resulting sum was standardized to T-scores with a mean of 50 and standard deviation of 10 for the total group of 53 teachers. Table 1 presents a description of the 5 dimensions.

INSERT TABLE 1 HERE

Table 2 presents the number of GATE items, Coefficient Alpha reliability, ad the mean T-score for the 36 Reading teachers. Coefficient

INSERT TABLE 2 HERE

Alpha reliability was estimated using Hoyt's (1941) method.

Residual Achievement

Using the General Linear Model (Barr, 1976) pretest Reading achievement was regressed on posttest Reading achievement and residuals were calculated using the following equation:

Gain = Posttest - 21.29 + 0.77 x Pretest.

These residuals were the dependent variable in the subsequent analyses.

Classification

The two-way classifications were effected by dividing students into high and low SES groups and high and low teacher behavior groups. The mean SES for the total sample (3.7) and the appropriate behavior mean (see Table 2) were used in determining the high and low group memberships.

The SAS General Linear Model was again used to treat the data in a 2x2 ANOVA.

Results

A summary of the 5 2-way analyses is shown in Table 3 which summarizes the Type IV sum of squares, (these treat each variable as if it were the last to enter) the F and probability.

INSERT TABLE 3 HERE

Table 4 displays the means for the main effects to indicate the direction of the differences.

INSERT TABLE 4 HERE

The analyses produced no significant interaction F ratios. However, observation of Figures 1-5 points to 3 interactions of possible interest.

INSERT FIGURES 1-5 HERE

The cell means of the low SES students show more difference in both structural student behavior and low level cognitive questions than high SES. The cell means of the high SES show more difference in hostility than low level SES.

Conclusions

The results of this study uphold many previous findings that high SES students score higher in reading than low SES. High and low frequency of teacher behaviors also make a difference in reading behavior.

Structured academic time does not produce better reading achievement for either high or low SES students. Structured student behavior has a negative impact with a more damaging effect on low SES. Students under the influence of hostile teacher behavior are negatively affected. Low SES students achieve better with low cognitive level questions. Students who have the opportunity to participate in small group activity, both prescribed and independent achieve at a higher rate.

The teacher and more specifically the teacher's behaviors make a difference in reading achievement. These behaviors can be identified and measured. It is heartily recommended that research in this area be continued.

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TABLE 1

DESCRIPTION OF OBSERVED BEHAVIORS

Variable	Dimension	Teacher Behavior	Student Behavior
1. Teacher Structure	[illegible]tured student behavior	Suggests, guides	Listens, watches, complies Answers questions directed to him Voluntarily answers questions Asks questions for information and verification
	Structured Academic Time	Presents Procedural instructions Explains, discusses, tells	Listens, complies Primarily answers question directed to him
		Asks questions - Use or application Recall Amplify (evaluation of own and others' ideas) Student opinion Cognitive status	Asks questions for information or verification during procedure or focus
		Responds Waits Focuses	
		Methodology Inductive Deductive Expository	

TABLE 1 (continued)

Variable	Dimension	Teacher Behavior	Student Behavior
2. Affect	Teacher hostility and rebuking behavior	Presents Directs, commands Response Rejects, criticizes Non-verbal affect Glares, frowns Verbal affect Warns, scolds, punishes, humiliates Firm, sharp	Answers question directed to him Answers questions voluntarily Questions for information and verification Distracted momentarily Responds to internal stimuli Off-task behavior
3. Cognitive level of questions	Teacher asks low cognitive level questions	Questions Recall Simple cognitive level	Answers questions directed to him Answers questions voluntarily
4. Group size	Small group without adult supervision	Gives specific tasks and directions to group Gives general directions to group	Completes assigned tasks Works on task of interest or need.

TABLE 2

GATE-SCORED DIMENSIONS

DIMENSIONS	No. of Items	Alpha Reliability	Mean Score for Reading Teachers
1. STRUCTURE			
Structured Academic Time	25	.78	50.17
Structured Student Behavior	8	.42	49.52
2. AFFECT			
Teacher Hostility	26	.68	[illegible]
3. COGNITIVE QUESTION LEVEL			
Teacher Asks Low Cognitive Level Questions	4	.32	51.45
4. GROUP SIZE			
Small Groups Without Supervisors	4	.51	49.88

TABLE 3

ANOVA

SUMMARY TABLES

Source	df	Type IV * SS	F	Prob.
1a Structure	1	534.91	21.07	.0001
SES Group	1	1534.63	7.34	.0069
Interaction	1	15.24	0.21	.6475
1b Structure	1	366.12	5.01	.0254
SES Group	1	1835.82	25.14	.0001
Interaction	1	53.02	0.73	.3944
2. Affect	1	429.69	5.89	.0154
SES Group	1	1451.90	19.90	.0001
Interaction	1	28.84	0.40	.5297
3. Cognitive level	1	156.15	2.13	.1448
SES Group	1	1814.81	24.76	.0001
Interaction	1	28.13	0.38	.5357
4. Group Size	1	399.41	5.47	.0195
SES Group	1	888.49	12.18	.0005
Interaction	1	0.91	0.01	.9110

* Type IV SS - account for effect of other variables in the model first.

TABLE 4

MAIN EFFECTS

RESIDUAL MEAN GAINS

	H	L
SES	1.49	-1.66
Structured Academic Time	-1.27	.88
Structured Student Time	- .82	.80
Hostility	-1.26	.59
Low Cognitive Level Questions	.65	- .62
Small Group	1.80	- .84

Figure 1

Struc. Time x SES

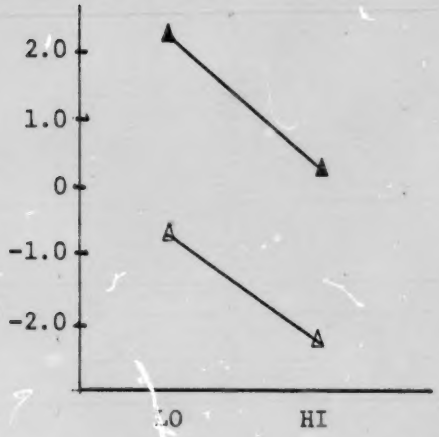


Figure 2

Struc. Behavior x SES

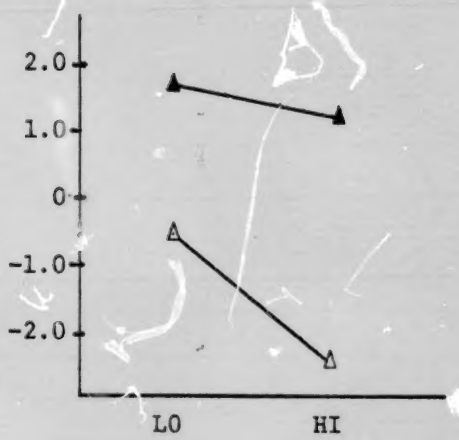


Figure 3

Hostility x SES

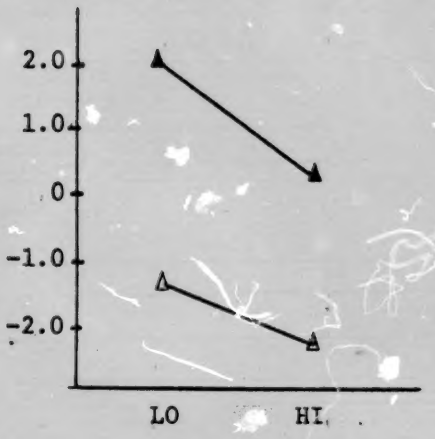


Figure 4

Cognitive level x SES

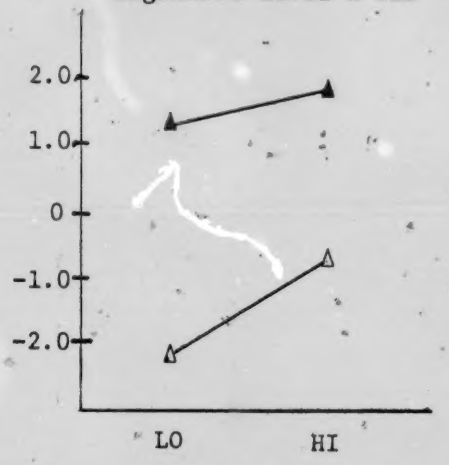
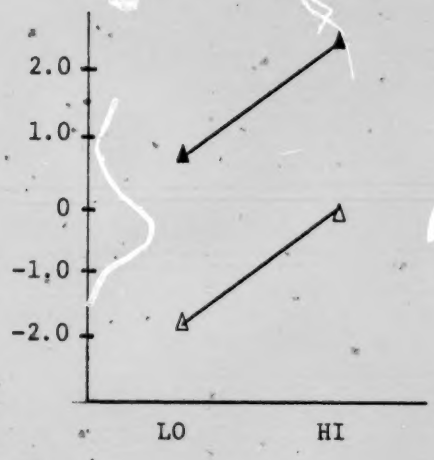


Figure 5

Small Group x SES



KEY:

▲ High SES

Δ Low SES

HI High frequency in dimension

LO Low frequency in dimension